

## REMARKS/ARGUMENTS

### *Status of Claims*

Claim 1 has been amended to correct antecedent basis.

Claims 1-36 are currently pending in this application.

Applicants hereby request further examination and reconsideration of the presently claimed application.

### *Objections to the Drawings*

The Examiner objected to the drawings filed by Applicants on August 4, 2008 for failure to show every feature of the invention specified in the detailed description. In response, Applicants have amended Figure 1 to address the Examiner's objections. Applicants submit concurrently herewith a ***Replacement Sheet*** for Figure 1. No new matter is introduced by way of the amendment. Applicants respectfully request approval of the ***Replacement Sheet***.

### *Claims Rejection – 35 U.S.C. § 102 and 35 U.S.C. § 103*

Claims 1-36 stand rejected under 35 U.S.C. § 102(e) as being anticipated by or in the alternative under 35 U.S.C. § 103(a) as being obvious over Gabriel, U.S. Patent Publication No. 2003/0134433 (hereinafter *Gabriel*). Claims 1-36 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Gabriel* in view of Bradley, U.S. Patent Publication No. 2004/0043527 (hereinafter *Bradley*), Clawson, WO 00/51186 (hereinafter *Clawson*), and Lieber, U.S. Patent No. 7,129,554 (hereinafter *Lieber*).

According to MPEP § 2131, “[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” Likewise, as noted by the United States Supreme Court in *Graham v. John Deere Co. of Kansas City*, an obviousness determination begins with a finding that “the prior art as a

whole in one form or another contains all” the elements of the claimed invention. *See Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 22 (U.S. 1966). Applicants submit that the cited references either singly or in combination do not disclose each and every element set forth in the pending claims.

Applicants’ claim 1 recites:

“A field effect transistor comprising:  
a source;  
a drain;  
a gate;  
at least one carbon nanotube on the gate; and  
a dielectric layer that coats the gate and a portion of the at least one carbon nanotube,  
wherein the at least one carbon nanotube has an exposed portion that is not coated with  
the dielectric layer, and **wherein the exposed portion is functionalized with at least one indicator molecule.**” (Claim 1, emphasis added)

Independent claims 9, 24, and 30 similarly recite the limitation that the carbon nanotube comprises an exposed portion that is functionalized.

Applicants’ definition of the term “exposed portion” differs from that asserted by the Office Action

Applicants direct the Examiner’s attention to Figure 1 which illustrates an embodiment of the field effect transistor of the present application. Referring to Figure 1, the carbon nanotube 35 on gate 25 has an exposed portion 40 that is not coated by the dielectric layer (e.g., SiO<sub>2</sub>). This is described by Applicants as:

“The top end of the coated nanotube 35 **is etched to remove the coating and provide an exposed nanotube portion 40.**”  
(Paragraph 0025, emphasis added)

The Office Action asserts that *Gabriel* discloses “[t]he nanotube has an ‘exposed portion’ exactly where the ‘gate’ is disposed on the nanotube, in order for the ‘indicator molecules’ to detect and transfer a signal or ‘sense’ to the nanotube 10. See figure 4A and the specification wherein the

'indicator molecules' may be directly attached to the nanotube 10, and therefore 'exposing' the nanotube to the sensed moiety. *See* Office Action, page 3. The Office Action suggests the definition of "exposed portion" is interpretable to include a number of embodiments disclosed by *Gabriel*. Applicants' instant specification provides a clear definition of the term "exposed portion." According to MPEP § 2111

The Patent and Trademark Office ("PTO") determines the scope of claims in patent applications not solely on the basis of the claim language, but upon giving claims their broadest reasonable construction "in light of the specification as it would be interpreted by one of ordinary skill in the art." *In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364[, 70 USPQ2d 1827] (Fed. Cir. 2004). Indeed, the rules of the PTO require that application claims must "conform to the invention as set forth in the remainder of the specification and the terms and phrases used in the claims must find clear support or antecedent basis in the description so that the meaning of the terms in the claims may be ascertainable by reference to the description." 37 CFR 1.75(d)(1), emphasis added

Thus, the Office Action should refer to the instant application which clearly sets forth a definition of the term "exposed portion" as a portion not having the dielectric layer/coating. Consequently, Applicants provide in claims 1, 9, 24, and 30 a field effect transistor comprising a nanotube having an exposed portion which is defined in specification and the claim as a portion that "is not coated with the dielectric layer."

*Gabriel does not disclose functionalizing an exposed portion*

Applicants' claim 1 describes functionalization of the exposed portion of the nanotube. This is further supported in the instant application which recites:

"Functionalizing exposed nanotube portion 40 comprises attaching at least one indicator molecule to exposed nanotube portion 40."(Paragraph 0026, emphasis added)

"Indicator molecules of the present invention include any molecule that is attachable to exposed nanotube portion 40."(Paragraph 0026, emphasis added)

In contrast, *Gabriel* discloses structures wherein the functionalization occurs on a surface having a coating layer and the functionalizing molecules extend through the coating layer. Specifically *Gabriel* discloses:

“One or more **molecular transducers 12, which represent a form of functionalization** that is responsive to specific target molecules, are positioned **so as to extend through coating layer 11.**” (Paragraph 25, emphasis added)

“**The protective layer includes molecular transducers** 12-1, 12-2, and 12-3 that are capable of sensing one or more targeted molecules.” (Paragraph 0046, emphasis added)

This is further supported by the descriptions of the use of “tether molecules” wherein “the length of the tether molecules is commensurate with the thickness of the protective layer 11”, *see* paragraph [0047] of *Gabriel*. In other words, *Gabriel* discloses by analogy an insulated wire with a sensing device that penetrates the insulation to access the surrounding environment. This is in contrast to the Applicants’ claimed subject matter which, by analogy, would be an insulated wire having a portion of the insulation removed and the sensing device attached to that portion of the wire where the insulation was removed (i.e., the exposed portion). Applicants respectfully submit *Gabriel* does not disclose each and every element of the Applicant’s claimed invention. Furthermore, the secondary elements are not cited by the Examiner for the purpose of providing such missing elements.

*Gabriel teaches away from the use of a functionalized exposed portion*

The Federal Circuit has held, “evidence ‘that the prior art teaches away from the claimed invention in any material respect’” rebuts a *prima facie* case of obviousness. *See In re John B. Sullivan*, C.A. No. 2006-1507 at 9 (Fed. Cir. August 29, 2007) (citing *In re Peterson*, 315 F.3d 1325, 1331 (Fed. Cir. 2003)).

“A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant.” See *In re Gurley*, 31 USPQ2d 1130, 1132 (Fed. Cir. 1994).

Applicants respectfully submit the disclosure of *Gabriel* teaches away from the instantly claimed field effect transistor having an **“exposed portion is functionalized with at least one indicator molecule.”** Specifically *Gabriel* discloses:

“The molecular transducers 12 are coupled to nanostructure 10. When a molecular transducer 12 interacts with a targeted molecule near the surface of coating layer 11, it transmits a signal representing the sensing of the targeted molecule to the nanostructure 10 through the coupling between the molecular transducer 12 and the nanostructure 10. **Full functionalization of the nanostructure is thus accomplished by the coating and the molecular transducer together.**” (Paragraph 25, emphasis added)

This is further supported by the embodiments disclosed which emphasize a structure wherein the coated portion of the nanotube is functionalized. Specifically *Gabriel* discloses:

“In the opening 23 **one or more molecular transducers are disposed within the protective layer 11 so to extend beyond it and into the local sensing environment 56,** providing communication between nanostructure and the local sensing environment.’ (Paragraph [0032], emphasis added)

**“The molecular transducer 12 extends from the outer surface of the protective layer 11** to the proximity of the nanostructure 10 through the protective layer” (Paragraph [0038], emphasis added)

*Gabriel* discloses structures wherein the functionalization occurs on a surface having a coating layer and the functionalizing molecules extend through the coating layer. Thus, *Gabriel* teaches away from the Applicants’ claimed structures which have an “exposed portion” lacking a coating layer. One of ordinary skill in the art when looking to *Gabriel* would not seek to modify the reference to create an exposed portion by removing a portion of the coating layer and

functionalizing the exposed portion as this would be contrary to the teachings of *Gabriel* where “full functionalization of the nanostructure is accomplished by the coating and the molecular transducer together.”

In consideration of the foregoing, Applicants respectfully submit the pending claims are neither anticipated by nor are obvious in view of the cited references.

### CONCLUSION

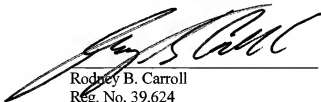
Consideration of the foregoing amendments and remarks, reconsideration of the application, and withdrawal of the rejections is respectfully requested by Applicants. No new matter is introduced by way of the amendment. It is believed that each ground of rejection raised in the Final Office Action dated November 4, 2008 has been fully addressed. If any fee is due as a result of the filing of this paper, please appropriately charge such fee to Deposit Account Number 50-1515 of Conley Rose, P.C., Texas. If a petition for extension of time is necessary in order for this paper to be deemed timely filed, please consider this a petition therefore.

If a telephone conference would facilitate the resolution of any issue or expedite the prosecution of the application, the Examiner is invited to telephone the undersigned at the telephone number given below.

Respectfully submitted,  
CONLEY ROSE, P.C.

Date: \_\_\_\_\_

2-16-09



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